

UNITED STATES DISTRICT COURT  
SOUTHERN DISTRICT OF NEW YORK

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STEPHANIE WEDRA, individually on behalf of:	:	
herself and on behalf of all others similarly situated,	:	Civil Action No. 7:19-cv-03162-VB
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Plaintiff,	:	
v.	:	
	:	
CREE, Inc.,	:	
	:	
Defendant.	:	
	:	
	:	
_____	x	

**MEMORANDUM OF LAW IN OPPOSITION TO DEFENDANT CREE, INC'S  
MOTION TO STRIKE EXPERT REPORT AND OPINIONS OF GARY ALLEN PH.D.**

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Plaintiff, Stephanie Wedra (“Plaintiff”), respectfully submits this memorandum of law in opposition to Defendant Cree, Inc.’s (“Defendant” or “Cree”) Motion to Strike Expert Report and Opinions of Gary Allen, Ph.D. Dkt. No. 76 (“Motion” or “Mot.”).

## **I. Introduction**

Plaintiff’s expert, Dr. Gary Allen, is eminently qualified to offer opinions that the relevant Cree LED Lightbulbs (the “Lightbulbs”)<sup>1</sup> suffered from a common design defect that “they operate too hot” and “because of this will experience premature, catastrophic failure.” Expert Report of Gary R. Allen, Ph.D., Sultz Class Cert Decl., Ex. 2 (“Allen Report.”) at 3. Defendant’s Motion mischaracterizes Dr. Allen’s opinions, methodologies, and the law and fails to grapple with the substance of Dr. Allen’s testimony. Cree’s core contention is that Dr. Allen’s analysis is not based on industry standards or industry guidelines, but it does not (because it cannot) point to any standards or guidelines that Dr. Allen failed to consider. Indeed, as Dr. Allen repeatedly explains in his Report and Rebuttal Report, reiterated at his deposition, and supported with industry literature, there are no industry standards or guidelines in existence for testing for catastrophic failure of LED Lamps (not components), or for selecting Target Maximum Temperatures of LEDs operating inside an LED Lamp, under typical consumer applications. *Id.* 8-9, 66; Transcript of the Deposition of Dr. Gary Allen (“Allen Dep. II”) 24:2-27:22<sup>2</sup>. A typical consumer will be switching a LED Lightbulb on and off throughout the use of the Lightbulb. Dr. Allen confirms that any test that is used to predict how a Lightbulb will perform for a consumer must account for these on/off cycles. All current industry standards or tests only test at the component level or do not account for typical consumer applications

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<sup>1</sup> “LED Lightbulbs” means all of the bulbs listed in the chart that was attached as Exhibit 1 to the Declaration of Jason P. Sultz in Support of Class Certification (“Sultz Class Cert. Decl.”).

<sup>2</sup> Excerpts of Dr. Allen’s deposition transcript in this action (“Allen Dep. II”) are attached as Ex. 6 to the Second Declaration of Jason P. Sultz in Support of Plaintiff’s Motion for Class Certification (“Second Sultz Decl.”). Excerpts of Dr. Allen’s previous deposition in *Young v. Cree, Inc.*, 4:17-cv-0625-YGR (N.D. Cal.) (“Allen Dep. I”) are attached as Ex. 7 to the Second Sultz Decl.

(i.e., switching the lights on and off). However, Dr. Allen did follow and rely on engineering best practices to reach his opinions and those opinions are corroborated by third-party studies. Allen Report at 67; Rebuttal Report of Gary R. Allen, Ph.D. (“Allen Rebuttal Report”) §I ¶3.d-e, attached hereto as Ex. 1 to the Second Sultz Decl.

Dr. Allen bases his opinions on scientific evidence and his opinions are corroborated by, and consistent with, the results of a third-party independent test conducted by the California Public Utilities Commission (“CPUC”). Dr. Allen goes into sharp detail as to (1) why the lightbulbs can be reliably grouped for the purposes of analyzing their thermal management systems (despite any variation in the Lightbulbs) and (2) what exactly causes the Lightbulbs to fail. Allen Report at 3, 41-63, 64-66. Specifically, the Lightbulbs share a common thermal management system and hence, design defect – a poor design of the heat sink, which results in overheating of electronic components like the electrolytic capacitor. *Id.* As a result, the Lightbulbs are prone to premature failure when subjected to typical consumer use (i.e. on/off switching). *Id.* Moreover, Dr. Allen not only possesses the requisite expertise to identify the target maximum temperatures for operation of the Lightbulbs, he identifies corroborating scientific support for the principles underlying his testing analysis. Furthermore, Dr. Allen explains in excruciating detail how and why he is certain that Cree LED Lightbulbs were included in the CPUC test and how and why he is certain that Cree LED Lightbulbs are those that are identified as Make #5 in the CPUC test. *Id.* 15-22; Allen Dep. II 53:19-58:4.

Dr. Allen is indisputably qualified as an expert in this area, and his testimony is relevant and reliable. Dr. Allen applied sound scientific methodology with intellectual rigor and his opinions and scientific testimony should be tested at trial. At the very least, regardless of ultimate admissibility at the merits stage, Dr. Allen’s testimony is certainly sufficient at the class certification stage to help demonstrate that the requirements of Rule 23 have been met. Accordingly, the Court should deny Cree’s motion.

## II. Admissibility Standard

The courts serve a “gatekeeping function” under Federal Rule of Evidence 702 to ensure “that an expert’s testimony both rests on a reliable foundation and is relevant to the task at hand.” *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579, 588 (1993). As part of this function, the district court should consider the indicia of reliability identified in Rule 702, namely: (1) “that the testimony is based on sufficient facts or data”; (2) that the testimony “is the product of reliable principles and methods”; and (3) that “the expert has reliably applied the principles and methods to the facts of the case.” Fed. R. Evid. 702. In short, the district court must “make certain that an expert, whether basing testimony upon professional studies or personal experience, employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field.” *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 152 (1999).

While *Daubert* has identified a number of factors bearing on reliability, “the *Daubert* inquiry is fluid and will necessarily vary from case to case...and [does] not constitute, however, a ‘definitive checklist or test.’” *Amorgianos v. Amtrak*, 303 F.3d 256, 267 (2d Cir. 2002) (quoting *Daubert*, 509 U.S. at 593). “A district court should remember that the Federal Rules of Evidence have a ‘liberal thrust’ and have a ‘general approach of relaxing the traditional barriers to ‘opinion’ testimony.’” *In re Teva Sec. Litig.*, No. 3:17-cv-558 (SRU), 2021 U.S. Dist. LEXIS 43316, at \*33 (D. Conn. Mar. 9, 2021) (quoting *Daubert*, 509 U.S. at 589). “Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence.” *Id.* (quoting *Daubert*, 509 U.S. at 596.).

## III. Dr. Allen is Qualified

Cree does not challenge Dr. Allen’s qualifications—nor could it. Dr. Allen has extensive educational and practical experience in the engineering and design of LED lightbulbs. Dr. Allen has a Ph.D. and MS in astrophysical sciences from Princeton University and MS and BS degrees from

Pennsylvania State University. Allen Report at 6. He conceived and designed the world's first LED replacement lamp to be certified under the Energy Star program. *Id.* at 5. He has decades of experience with world-leading research and industrial institutions in the fields of lighting, applied physics, product design, and patent generation and analysis, including as the principal engineer and engineering manager of GE Lighting and as a research physicist with Sylvania Lighting. *Id.* at 6-7.

#### **IV. Overview of Dr. Allen's Methodology and Opinions**

Dr. Allen opines that the Lightbulbs can be evaluated collectively because they share similar internal components, and they share a common defect: "they operate too hot, i.e. the operating temperature is too high, and because of this will experience premature failure." Allen Report at 3, 4-5. In particular, the heat sinks are poorly designed, and as a result, temperatures are too high and exceed target maximum temperatures under a range of ambient air temperatures at two locations: the LED junction and the electrolytic capacitor. *Id.*

##### **A. The Lightbulbs Can Be Assessed Collectively Because They Have the Same Internal Components and a Similar Thermal Management Design**

In analyzing the Lightbulbs' expected life, Dr. Allen was able to group the Lightbulbs into categories based upon their relevant thermal management components. *See* Allen Report at 4, 64-66, Tables 2-3. Dr. Allen's electrical engineering expertise "developed from 40 years of experience with world-leading research and industrial institutions in the fields of Lighting, Applied Physics, Product Design, and Patent Generation and Analysis" allowed him to do so for analysis and demonstrative purposes. *Id.* at 6. Among other achievements, Dr. Allen developed the world's first PAR LED replacement lamp to meet or exceed the performance and aesthetics of halogen lamps, the world's first Energy Star-qualified A-line LED replacement lamp, and GE's first BR30 LED replacement lamp. *Id.* at 7.

Dr. Allen analyzed these Lightbulbs with a focus on design elements related to reliability and useful life of the product in consumer applications. *Id.* at 3, 63-64. He concluded that many were



functionally equivalent designs that share the following attributes: shape and dimensions of heat sinks, PCBs and bulbs; air vent dimensions and location; thermal interface materials or lack of; thermal air gap where a TIM should have been used; location and potting of the electrolytic capacitor; thermal load which equals the LED Lamp power minus the power flux radiated away as lumens. *Id.* at 66. Dr. Allen concluded there were seven basic design types. *Id.* at 65. Dr. Allen then analyzed the fundamental design architecture and visual appearance of the categories of LED Lightbulbs and concluded there are four fundamental “LED Lamp Design Architectures” of Cree LED Lightbulbs that were appropriate for common analysis. *Id.* at 64-65. In particular, Dr. Allen’s grouping of the Lightbulbs into four unique “architectures” is based on visual examination, their interior and exterior components, the dimensions and characterization of each heat sink, and assessment of each thermal circuit to quantitatively determine the performance of each LED Lightbulb. *Id.* at 64-65.

**B. Dr. Allen’s Opinion That the Lightbulbs Share a Common Design Defect**

In order to determine whether the Lightbulbs are capable of performing as advertised, Dr. Allen conducted the following testing: (1) a visual inspection of the Lightbulbs; (2) temperature measurement and testing using an infrared imaging camera or thermocouple at particular measurement points; and (3) a comparison to market competitors to corroborate the results of his testing. Allen Report at 25, 58-63. He also considered, and compared his own data with, Cree’s internal laboratory test results, including those showing temperature data. *Id.* at 28. Dr. Allen tested samples of all the available design categories or types of Lightbulbs described above, which accounts for variations in characteristics such as model, shape, size, color, brightness, and wattage replacement and reviewed numerous internal Cree testing documents. *See id.* at 64-66. Dr. Allen’s testing shows that despite these variations, all the Lightbulbs run too hot, which stresses the electronic components beyond what they can handle and results in premature failures and shortened lifespans. *Id.* at 3-4, 30, 41 & Table 6. In particular, when operating in 25 °C and 45° C ambient air, the LED junction temperature and

electrolytic capacitor temperature exceed target maximum temperatures in amounts ranging from 10 °C to 40 °C. *Id.* at 3-4. Based on his testing, analysis, and experience, Dr. Allen concluded that all the Lightbulbs share similar internal components, failure modes and a common defect, namely, that “they operate too hot” because of an under-designed thermal management system. *Id.* Because of this common design defect, the LED Lightbulbs will commonly experience premature failure. *Id.* at 4. Dr. Allen predicts an estimated lifetime of 1,500 to 6,000 hours for the Cree LED Lightbulbs which is significantly shorter than the 25,000-hour lifetime claims by Cree. *Id.*

## **V. Argument**

### **A. Dr. Allen’s Methodologies and Opinions Are Reliable**

#### **1. Dr. Allen’s Methodology for Grouping the LED Lightbulbs is Reliable**

Cree’s primary argument is that Dr. Allen’s opinions are not reliable because there “is no indication that Dr. Allen’s methodology of Lamp classification has been tested or subjected to peer review.” Mot. at 10. In support of this contention, Cree cites the list of factors identified in *Daubert*, 509 U.S. at 593-94. Mot. at 9-10. But, as noted above, that is not the standard. *See Kumho Tire*, 526 U.S. at 150-151. Rather, the expert must employ “the same level of intellectual rigor that characterizes the practice of an expert in the relevant field. *Id.* at 152.

Cree’s contention is a gross mischaracterization of Dr. Allen’s opinion. Notably, Cree points to no publication, authority or any other source that Dr. Allen failed to consider. Indeed, that is because there are none. Dr. Allen explains that no industry standards or guidelines exist for him to follow in order to categorize the LED Lightbulbs to determine if they are experiencing failure when subjected to typical consumer behavior and whether the failure is common across the LED Lightbulbs. Allen Report at 64 (“There is no industry standard for the thermal design of an LED Lamp.”); Allen Rebuttal Report at § II ¶¶ 3-6. Rather, he offers his opinion, based on decades of relevant experience and his assessment of the LED Lightbulbs, that they fall into four fundamental

architectures that can be evaluated on a common basis and, in fact, share a common defect. *See Davis v. Carroll*, 937 F. Supp. 2d 390, 412 (S.D.N.Y. 2016) (noting that a court may permit expert testimony “where a proposed expert witness bases her testimony on practical experience”) (citing *Kumho Tire Co., Ltd. v. Carmichael*, 526 U.S. 137, 149-50 (1999)); *Chill ex rel. Calamos Growth Fund v. Calamos Advisors LLC*, 417 F. Supp. 3d 208, 242 (S.D.N.Y. 2019) (“fact that [the expert’s] opinions are not rooted in quantifiable, scientific analysis is no bar to their admissibility. . . He bases his opinions on his ‘experience working with mutual funds and institutional account clients’”); *Danley v. Bayer (In re Mirena IUD Prods. Liab. Litig.)*, 169 F. Supp. 3d 396, 413 (S.D.N.Y. 2016) (“Indeed, expert testimony may be based on ‘experience alone—or experience in conjunction with other knowledge, skill, training or education.’”) (quoting Fed. R. Evid. 702 advisory committee’s note.); *Kumho Tire Co.*, 526 U.S. at 150 (The *Daubert* factors “may or may not be pertinent in assessing reliability, depending on the nature of the issue, the expert’s particular expertise, and the subject of his testimony.”) (internal quotation marks omitted)).<sup>3</sup>

This is exactly the sort of case where reliability is sufficiently shown through “experience alone – or experience in conjunction with other knowledge, skill, training or education.” *Danley*, 169 F. Supp. 3d at 413. Dr. Allen relies on his four decades of experience and extensive knowledge of LED lamp design and sound scientific principles to devise his categorization method because this is simply not a practice that the industry has a need for such that a standard would exist. For the purposes of

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<sup>3</sup> Defendant’s argument that the use of a non-peer reviewed method or industry standard automatically renders his opinion inadmissible is simply not the law, and the cases cited for that purpose are inapposite and factually distinguishable. *See Wills v. Amerada Hess Corp.*, 379 F.3d 32, 38-40 (2d Cir. 2004) (affirming exclusion of a known and controversial theory of causation without a well-reasoned explanation of why an alternative and widely accepted theory was not appropriate and relied only on animal instead of human studies); *Zaremba v. GMC*, 360 F.3d 355 (2d Cir. 2004) (excluding expert testimony when expert did not perform any tests of his proffered design, offered no calculations or measurements to support his design, and did not have the proper education or relevant experience in the field); *Colon v. Bic USA, Inc.*, 199 F. Supp 2d 53, 75-76 (collecting cases that *testing* is helpful when expert offers an alternative design).

evaluating whether a common design defect would cause the LED Lightbulbs to prematurely fail, Dr. Allen categorized the Cree LED Lightbulbs into the seven “Lamp Designs” based on their thermal characteristics that would lead them to have the same thermal response when operated. Allen Dep. I 42:1-10. Of those seven lamp designs, there are four “Lamp Architectures,” or thermal management systems. Allen Report at 64. Dr. Allen assessed the critical attributes of the Lightbulbs to determine whether they could be considered on a common basis. Dr. Allen notes that the four Cree LED Lamp Architectures are analyzed according to “(1) exterior and interior components; (2) dimensions and characterization of each heat sink []; and (3) each thermal circuit in sufficient detail to uniquely and quantitatively determine the thermal performance of the particular Cree LED Lamp that was chosen to represent each of the 4 Cree LED Lamp Architectures.” Allen Report at 63-64.

## 2. Dr. Allen’s Methodology for Testing for a Design Defect is Reliable

The same is true for Dr. Allen’s methodology for assessing whether the LED Lightbulbs catastrophically fail when subjected to typical consumer behavior, which includes switching the Lightbulbs on and off. Again, Dr. Allen explained that there is no industry standard or peer reviewed method for testing or predicting catastrophic failures of LED Lamps (not simply the LED component, but the entire LED Lamp) when subjected to typical consumer behavior. Allen Report at 9; Allen Dep. II 26:16-23; Allen Rebuttal Report at § II ¶¶ 3-6, § V ¶¶ 1.f-2.e. The standards that do exist either test only at the component level or test for continuous burn, and do not contemplate the consumer application of switching the light on and off. Allen Dep. II 24:13-26:15; *see also* Transcript of the Deposition of Morgan Pattison (“Pattison Dep.”), Second Sultzner Decl., Ex. 4 at 68:1-22, 118:6-16, 134:6-16. Dr. Allen supports his contention that “there is no standard measurement technique to predict or quantify the lifetime of an LED lamp in the intended customer application” (Allen Dep. II 27:19-22) with an article published in the leading LED industry trade magazine LEDs Magazine that also concludes that “there remains much work to be done” on creating “reliability tests

and projection standards for LED lighting at the lamp or luminaire level.” Allen Report at 9; Allen Dep. II 27:6-17; *see also* Allen Report at 9 (CPUC study recognized and sought to address the lack of industry standards to account for consumer application), 68 (citing to Swingler textbook and specifications for Department of Defense that consumer requirements and constraints should be taken into account); Allen Rebuttal Report § II ¶ 5 (citing June 2021 publication commissioned by the Solid State Lighting Annex Energy Efficient End-Use Equipment (4E) of the International Energy Agency (IEA) “IES LM-84 does not include catastrophic failures or power cycling.”) Even Cree’s own expert agreed that “existing standards for characterizing reliability of lighting products are not perfect” and “how to deal with that and characterize that in a meaningful way is still an issue.” Pattison Dep. 137:7-21. Unfortunately, the court in *Young* misunderstood this crucial point. Dr. Allen does not disagree with the industry standard durational tests that exist, he opines that they are simply not the proper tests for the purposes of this case (i.e., to measure whether the Cree Lightbulbs will prematurely fail) because they do not contemplate typical consumer behavior. *See Young v. Cree, Inc.*, No. 4:17-cv-06252-YGR, 2021 WL 292549, at \*11 (N.D. Cal. Jan. 28, 2021) (“There are ample accepted peer-reviewed and vetted industry standards for reliability testing based on long-term durational testing of a large number of LED lamps, including...That Dr. Allen disagrees with these standards does not mean that they are irrelevant.”); *c.f.* Allen Rebuttal Report at § II ¶¶ 3, 9 (explaining that the current industry testing “while necessary, is not sufficient to ensure reliability over life in a consumer application); Pattison Dep. 142:20-24 (admitting that a reasonable homeowner would not turn on a LED and leave it on for 6,000 hours).

Dr. Allen, instead, relied on his vast experience in the LED industry and as an LED lamp designer to develop a methodology to test the LED Lightbulbs in a consumer application to determine if a design defect causes the LED Lightbulbs to prematurely fail. Dr. Allen sets out his method in excruciating detail and relies on scientific principles to develop a methodology that more than rises to

the “level of intellectual rigor that characterizes the practice of an expert in the relevant field.” *Kumho Tire*, 526 U.S. at 152; *see also Amorgianos*, 303 F.3d at 266-67 (“[t]his is not to suggest that an expert must back his or her opinion with published studies that unequivocally support his or her conclusions”). Dr. Allen’s opinion is supported by engineering best practices related to design for reliability. Allen Report at 3, 67-68. These best practices make clear that it is necessary to consider product application in designing for reliability—in other words, where and when will the Lightbulbs be used?—but Cree ignored these principles in its design of the Lightbulbs. *Id.* at 68-69. Indeed, studies conducted and published by third-parties confirm Dr. Allen’s testing and conclusion that the Lightbulbs fail prematurely. *Id.* 10-24, 72-76.

Dr. Allen clearly explained what he did and why, and Cree raises no serious challenge to his methodology. Specifically, Dr. Allen took temperature measurements of exemplar Lightbulbs using specified equipment and made related observations. Allen Report at 24. He took those temperature measurements at particular locations on the Lightbulbs—the LED junction, the electrolytic capacitor, and the heat sink—because those locations are “sufficient to identify the most likely temperature-related failure modes of an LED Lamp.” *Id.* at 24-28. And temperature matters because, as the LED lightbulb engineering community knows, the temperature of these components are “the single most critical design factor responsible for the operational life of LED Lamp products,” and in particular, the LED junction and electrolytic capacitor “provide the greatest insight into the expected reliability and lifetime of an LED Lamp.” *Id.* at 28. The importance of temperature is supported by publication and the knowledge of the engineering community. *Id.* at 28-29. Dr. Allen calculated target temperatures for the LED junction, capacitor, and heat sink. *Id.* at 32-33. He explained why those target temperatures were appropriate. *Id.*

Ultimately, Dr. Allen used appropriate measurement equipment and techniques to take the temperatures and other measurements of the Lightbulbs. *Id.* at 34-36. He took steps to account for

potential inaccuracies and make sure his temperature measurements were accurate and erred on the side of depicting lower than actual temperatures. *Id.* at 37-39. And he recorded the temperatures at the locations discussed above. *Id.* at 41-42 & Table 6. From this data, Dr. Allen reached certain conclusions about the amount of excess heat at the LED junctions and electrolytic capacitors in the Lightbulbs, which will result in significantly decreased lifespans under advertised use temperatures and the packaging instructions and a high percentage of early failures. *Id.* at 42-44. Finally, Dr. Allen explained why the design of the Lightbulbs led to overheating based on fundamentals of thermal management for LED lightbulbs and a thermal analysis of the four design architectures of the Lightbulbs discussed above. *Id.* 45-63.

The reliability of Dr. Allen's analysis is demonstrated by his testing and his application of fundamental principles of thermal management and engineering design of electronic products. Again, Cree's argument fails because this is an issue where there are no relevant publications, guidelines, or standards. That does not mean that Dr. Allen's opinion is unreliable or inadmissible. *See Primiano v. Cook*, 598 F.3d 558, 567 (9th Cir. 2010) (reversing exclusion of expert and admitting his opinions based on his knowledge and experience because lack of peer reviewed literature is not a basis for exclusion). It simply means that the Court must assess whether Dr. Allen's opinion is *reliable*.

Based on Dr. Allen's qualifications, experience, and analysis—which he thoroughly explains, and which Cree could have attacked head on had he misunderstood some important attribute of the Lightbulbs, measured or calculated temperatures incorrectly, or misstated basic engineering principles relating to thermal management and the design of LED lightbulbs—his opinion is reliable. He sufficiently described his method and the reasons why he used each step in the method. He did so with the “intellectual rigor that characterizes the practice of an expert in the relevant field” and is thus reliable and admissible. Indeed, it is well-settled law that “[w]here an expert otherwise reliably utilizes scientific methods to reach a conclusion, lack of textual support may ‘go to the weight, not the

admissibility’ of the expert’s testimony.” *Amorgianos*, 303 F.3d at 267 (quoting *McCulloch v. H.B. Fuller Co.*, 61 F.3d 1038, 1044 (2d Cir. 1995)). Furthermore, “an expert’s use or application of her methodology, or the existence or number of supporting authorities for an expert’s opinion, go to the weight, not the admissibility of her testimony.” *Guardino v. Alutiiq Diversified Servs., LLC*, 457 F. Supp. 3d 158, 162 (N.D.N.Y. 2020); *see also* *McCulloch*, 61 F.3d at 1044 (“Disputes as to the strength of his credentials, faults in his use of differential etiology as a methodology, or lack of textual authority for his opinion, go to the weight, not the admissibility, of his testimony.”); *Martinez v. Costco Wholesale Corp.*, No. SACV181296JVSKEsx, 2019 WL 6655272, at \*4 (C.D. Cal. Sept. 19, 2019) (permitting expert to “testify as to how engineering principles and best practices inform his assessment of the design” where there were no applicable “specific design standards”).

*a. Dr. Allen’s Target Maximums are Reliable*

Specifically, Cree criticizes Dr. Allen for “not cit[ing] even one source that supports his ‘Target Maximums’” and cites to an excerpt of Dr. Allen’s deposition in the California action that simply reiterates that no industry standard or publication exists to establish target maximum temperatures when conducting the test that Dr. Allen conducted. *Id.* Cree mischaracterizes Dr. Allen’s Report and his testimony to create an inference of unreliability when, in fact, Dr. Allen justifiably relied on engineering best practices related to “Design for Reliability” when designing his test, including the target temperatures. Allen Report at 3, 66-68 (“there are engineering best practices related to Design for Reliability that advise that any engineering system should be designed with safety margins relative to maximum ratings of the individual components). Moreover, Dr. Allen did identify and provide sources that support and corroborate his opinions. Allen Dep. II 18:4-21 (identifying several third party sources that agree with his target temperature opinions); 35:8-9 (“My target temperature has been unequivocally validated by the CPUC testing”); Allen Report at 5 (“The CPUC results provide unambiguous validation that Allen’s Target Maximum Temperature of 105° C is the proper design



guideline for the Cree LED Lamps.”); Allen Rebuttal Report § I ¶ 3.j, § III ¶ 4, § V ¶¶ 3.a, 5.b.iii, § IX ¶¶ 1-2.

Cree focuses on Dr. Allen’s testimony that no source will specifically state that the LED Lightbulbs should be designed to run 20°C below the LED manufacturer’s rated operating temperature. Mot. at 13. However, Dr. Allen explained that there is a “general electronic practice referred to as the Arrhenius relationship that says for every 10 degrees C increase in electronic component, the failure rate will be double, the life will be cut in half.” Allen Dep. II 20:2-7; Allen Report at 28 (citing to Toshiba Reliability Handbook for this principle); Allen Rebuttal Report § III ¶¶ 4-6. Dr. Allen has shown that when subjected to consumer application of on/off cycles, the temperature of the LED will increase. Allen Report at 25-44. Accordingly, Dr. Allen has taken the temperature targets used by Cree, added in the effect of consumer use, and applied general electronic best practices and his own extensive experience to arrive at his opinion. As Dr. Allen explained, “difference between the certified temperature of which the Cree LED can operate and the actual temperature at which the Cree LED will operate in certain customer applications, means that they are exceeding their own design limit by 20 degrees C.” Allen Dep. II 22:8-13. Dr. Allen cites to third-party sources that support his opinion that the application of the system must be taken into account not simply the requirements of any one component.<sup>4</sup> Allen Report at 9; Allen Dep. II 22:14-19; Allen Rebuttal Report § V ¶ 5.b.iii. It is simply not the standard to require an expert to supply a peer-reviewed or published source for every conclusion reached based on sound scientific principles.

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<sup>4</sup> Cree disingenuously describes Dr. Allen’s opinions on “Target Maximums” as “personal preferences.” Mot. at 14. Dr. Allen made clear that his opinions are his “professional opinion[s]” (Allen Dep I 112:9) which is precisely the function of an expert. Dr. Allen laid out in excruciating detail the reasoning, support, and scientific principles that lay the foundation for his expert opinion which is a far cry from a subjective personal belief. All cases cited by Cree for that proposition are inapposite.

*Amorgianos*, 303 F.3d at 266 (an expert need not “back his or her opinion with published studies that unequivocally support his or her conclusions”).

### **B. Third-Party Studies Corroborate Dr. Allen’s Opinions**

The CPUC and Narendran studies discussed in Dr. Allen’s Report are relevant and reliable, and none of Cree’s arguments require their exclusion. Dr. Allen does not, as Defendant claims, urge this Court to find that the CPUC Study “supplants the heavily vetted industry standards for testing LED lamps.” Mot. at 20. Dr. Allen references the CPUC study as an example of a study done to test LED lamps in a way that takes into account consumer application, which none of the “heavily vetted industry standards” do. Allen Report at 10. Dr. Allen submits the CPUC as a published source that corroborates and validates Dr. Allen’s opinions. Allen Report at 5; Allen Rebuttal Report § I ¶ 3.d.

Cree next contends that because the CPUC kept the identities of the lamp manufacturers anonymous in its study that Dr. Allen is freely speculating that Cree is the manufacturer of Make #5 in the study. Mot. at 22. On the contrary, Dr. Allen explains in painstaking detail how he was able to identify Cree as Make #5. Allen Report at 15-22; Allen Dep. II 53:19-61:22. In short, he was able to compare close-up images provided in the CPUC report and compare them to his samples of the Cree LED Lightbulbs to identify key unique identifying features of the Cree LED Lightbulbs that he found. Dr. Allen explained each of the steps and features he used to make that determination and provides the photographs and documents he relied on and pointed out each identifying characteristic. Allen Report at 15-22. To say that Dr. Allen is freely speculating is a gross mischaracterization of Dr. Allen’s opinions. That a Cree employee, who has no LED design experience, disagrees with Dr. Allen (Mot. at 22) does not make his opinion or conclusions inadmissible, it simply goes to the weight of the evidence. *McCulloch*, 61 F.3d at 1044.

In an attempt to downplay the impact of the CPUC study, Defendant cherry-picks quotes and grossly misinterprets what it calls the “limitations” on the CPUC study. First, the CPUC’s statement

that “it was not the objective of this study to simulate the typical switching patterns in California homes” does not render the study inapplicable to this case. Dr. Allen explained at his deposition that CPUC described how their study differed from the typical consumer switching in that they were more conservative and put less stress on the LED lamps by not allowing them to reach the full warmed-up temperature but only allowed them to warm up to 95% of it. Allen Dep. II 76:1-79:10; Allen Rebuttal Report § XIII ¶ 2.a. CPUC, thus, “had about 10% less stress on each of the components in the LED lamps than a typical consumer application would experience.” Allen Dep. II 79:7-10.

Similarly, Cree conveniently only quoted the last phrase in the quote: CPUC’s statement that “[w]e currently lack the primary data necessary to reasonably extrapolate our lab results to the population of LEDs installed in California homes and, therefore, cannot reasonably estimate the extent to which current LED-rated life estimates are overstated.” CPUC study § 6.2. When properly read in context, this statement supports Dr. Allen’s conclusions. Dr. Allen noted at his deposition that, here, the CPUC is affirming that the present LED-rated life estimates are overstated but they do not have the formula “or a quantitative transfer function” between the current LED rated life-estimates and the actual life estimates in a consume application. Allen Dep. II 71:13-72:20 (“That’s what that sentence is saying. We don’t have the transfer function between the current LED ratings, which are known to be overstated, and what the real expected lifetime will be in the consumer application.”).

Finally, Cree argues that the CPUC tested Cree LED Lamps must be California-specific lamps with special specifications and therefore not relevant to this case with to a New York class of purchasers. This argument is belied by the CPUC Report itself. The CPUC Report specifically states that it included both California-specific and other lamps in the study in order to compare the impact of California’s more stringent quality requirements on the outcome of reliability testing. Allen Rebuttal Report § XI ¶ 3.a (quoting Section 1.3 of CPUC Report “Given this assessment, the specific research

objectives of this study were:...to assess difference in performance between California Quality Spec compliant LED lamps with the non-compliant competitors.”). The CPUC Report is clear that both California-specific and other Cree LED Lamps were tested. *Id.*

With respect to the Narendran study, the only criticism of Dr. Allen’s use of the study consists of two sentences quoting the study and citations to a declaration from Vollers, a Cree employee, who also simply cites the study. Mot. at 24. Cree presents no real argument to strike Dr. Allen’s use of the Narendran study.

### **C. Dr. Allen Reliably Applied his Methodologies**

Cree next contends that Dr. Allen did not reliably apply any of his methodologies to the facts and circumstances of this case. To this end, Cree relies on the testimony from two experts (one of whom is a Cree employee) who misinterpret, misstate and mischaracterize Dr. Allen’s methods and opinions. Neither of Cree’s experts are qualified to offer testimony on Allen’s methods, opinions or conclusions in this case and their testimony concerning Dr. Allen should be disregarded. At best these criticisms, if they are valid (which they are not), go to the weight of Dr. Allen’s testimony and not to its admissibility.

#### **1. Pattison and Vollers are Unqualified to Offer Testimony Concerning the Allen Report**

Cree submitted declarations from Mr. Jonathan Vollers and Dr. Morgan Pattison in support of their opposition to class certification.<sup>5</sup> Neither Dr. Pattison nor Mr. Vollers are qualified to offer testimony criticizing Dr. Allen’s methodologies or opinions. Neither has any direct experience in the design or analysis of the thermal management and reliability of LED Lamps. Allen Rebuttal Report at §II ¶ 1. As Dr. Allen explains in his Rebuttal Report, both Dr. Pattison and Mr. Vollers have

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<sup>5</sup> The Declarations of Jonathan Vollers is attached as Ex. 4 to the Declaration of Rebecca Lindahl In Support of Cree’s Opposition to Plaintiff’s Motion for Class Certification and In Support of Cree’s Motions to Strike Dr. Gary Allen and Dr. Andreas Groehn (“Lindahl Decl.”). The Declaration and Expert Report of Dr. Morgan Pattison is attached as Ex. 11 to the Lindahl Decl.

administrative roles involving the application of IES standards and Energy Star certifications, neither of which are relevant to the primary issue in the case and in Dr. Allen's Report, namely that the Cree LED lamps have a poor thermal design which causes them to operate too hot and creates high failure rates in consumer applications. Allen Rebuttal Report at § II ¶ 1, § V ¶ 1.a-f, § VI ¶¶ 1-5. Neither Dr. Pattison nor Mr. Vollers have been trained in LED thermal management design. They do not have any direct experience designing LED lamps for lifetime and reliability nor have they authored any publications on the relevant subject matter. Allen Rebuttal Report at § II ¶ 1, § V ¶ 1.a-f, § VI ¶¶ 1-5. Accordingly, the Court can and should decline to give any weight to the testimony of Dr. Pattison or Mr. Vollers. *See McCullock v. H.B. Fuller Co.*, 981 F.2d 656, 657-58 (2d Cir. 1992) (affirming district court ruling that plaintiff's proffered expert did not possess the required qualifications to testify as an expert on the primary issue in the case); *Louis Vuitton Malletier v. Dooney & Bourke, Inc.*, 525 F. Supp. 2d 558, 642 (S.D.N.Y. 2007) ("An expert qualified in one subject matter does not thereby become an expert for all purposes. Testimony on subject matters unrelated to the witness's area of expertise is prohibited by Rule 702.") (citing *Eagleton v. Guido*, 41 F.3d 865 (2d Cir. 1994) (sociologist was qualified to testify about effects of domestic violence, but not about whether a police department provided sufficient training to its officers responding to domestic violence reports)); *Quintanilla v. Komori Am. Corp.*, No. 04 CV 5227, 2007 U.S. Dist. LEXIS 33126, at \*12-14 (E.D.N.Y. May 4, 2007) (precluding as not qualified an engineer with no experience with printing presses or design of machine guards, even though he had experience in mechanical design for electronics); Fed. R. Evid. 702 (permitting testimony from "a witness qualified as an expert by knowledge, skill, experience, training, or education"). Further, even ignoring Dr. Pattison's and Mr. Vollers' lack of qualifications, their attacks on Dr. Allen's methodology go, at most, to the weight and credibility of his testimony rather than its admissibility. *McCullock*, 61 F.3d at 1044; *see also DSU Med. Corp. v. JMS Co.*, 296 F. Supp. 2d 1140,

1147 (N.D. Cal. 2003). And even ignoring that deficiency, their attacks on Dr. Allen’s methodology are without merit.

2. Generational Differences Within Design Architectures Do Not Affect Dr. Allen’s Opinions

Mr. Vollers argues that the Lightbulbs within the design architectures identified by Dr. Allen cannot be commonly evaluated because there are generational differences in the lines of Lightbulbs, such as wattages, LEDs, and heat sink designs. Vollers Decl. ¶¶ 75, 77. Mr. Vollers’ assertions grossly mischaracterize Dr. Allen’s testimony. As Dr. Allen explains in his Report and his Rebuttal Report, Dr. Allen asserts quantitatively the extent of the overheating of *each Cree LED Lamp Design* while generalizing that it is the poor design of the heat sink of the Cree LED Lamp Architecture that is responsible for the overheating of the respective Cree LED Lamp Design. Allen Rebuttal Report § VIII ¶ 3.a.

Mr. Vollers suggests that Dr. Allen’s categorization of Lightbulbs is contrary to Energy Star guidelines because Cree makes separate Energy Star submissions for different LED lightbulbs. *See* Vollers Decl. ¶¶ 76. That contention misunderstands Energy Star product specifications, which use the American National Standards Institute (“ANSI”) nomenclature for shapes and sizes of lightbulbs. Allen Report at 63-64. The ANSI standards categorize lamps according to their shapes and sizes. *Id.* The ANSI standard nomenclature refers to A19, A21, and BR30 lightbulbs, as does the Allen Report. *Id.* However, the characterization of A19, A21, and BR30 is based simply on lightbulb shape and is too high level and imprecise because it does not account for thermal design. *Id.* Thus, while there is no industry standard for characterizing the thermal design of LED lightbulbs, Dr. Allen used both ANSI nomenclature and Cree’s own nomenclature to be more precise and account for variations such as “filament tower” and “4Flow” Lightbulbs. *Id.*

Furthermore, Mr. Vollers’s argument ignores the fact that the Lightbulbs within each design architecture have the same thermal management components (the filament tower and heat sink). Allen

Report at 63-64. Cree conflates Energy Star requirements with Dr. Allen’s testing of the thermal management systems. Dr. Allen actually asserts quantitatively the extent of overheating of each of the Cree LED Lamp Designs while generalizing that it is the poor design of the heat sink is the Cree LED Lamp Architecture that is responsible for the over heating of the respective Cree Lamp Design. Allen Rebuttal Report §Viii ¶ 3.a.

*a. Dr. Allen Explained How the Defect Causes Lightbulb Failure*

Cree contends that “although Dr. Allen identified a purported defect, he did not provide the Court with any analysis of how that purported defect could cause catastrophic failures of Cree LED Lamps.” Mot. 18. This argument is hopelessly misguided.

Dr. Allen explained in detail why poor thermal management causes premature Lightbulb failure. *See supra* § IV.B.

First, as Dr. Allen explained, temperature matters at the LED junction, electrolytic capacitor, and heat sink because those locations are “sufficient to identify the most likely temperature-related failure modes of an LED Lamp.” Allen Report at 25-28. As the LED lightbulb engineering community knows, the temperatures of these components are “the single most critical design factor responsible for the operational life of LED Lamp products,” and in particular, the LED junction and electrolytic capacitor “provide the greatest insight into the expected reliability and lifetime of an LED Lamp.” *Id.* at 28. Temperature is the most likely failure mechanism of LED lightbulbs. *Id.* at 30. Indeed, based on the temperature data he collected, Dr. Allen explained in detail the thermal management problems in the design of the Lightbulbs and how they lead to overheating of critical components. *Id.* at 45-63.

Second, that Mr. Vollers, a Cree employee with no LED design experience, disagrees with Dr. Allen and states that the LED Lightbulbs operating too hot will not lead to premature failure but to only lumen degradation, color shift, or flicker does not make Dr. Allen’s opinions inadmissible. Mot.

at 18-19. Notably, Dr. Allen points out that such a suggestion is belied by Cree's own expert Dr. Pattison who asserts that parametric failures (i.e. lumen depreciation and color shift) depend more on continuous operation while catastrophic failures are determined largely by operating temperature and on/off cycles. Pattison Decl. ¶ 78; Allen Rebuttal Report at § V ¶ 5.b.v.

Furthermore, to argue that Mr. Vollers' disagreement with Dr. Allen renders Dr. Allen's expert opinion unreliable or inadmissible and goes against well-established case law. *Daubert*, 509 U.S. at 596. ("Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence."); *Gyllenhammer v. Am. Nat'l Red Cross*, No. 3:15-cv-01143 (BKS/DEP), 2018 U.S. Dist. LEXIS 177443, at \*5-8 (N.D.N.Y. Oct. 16, 2018) (court disregarded assertions that expert's opinions were "not the result of the application of reliable principles" or "generally accepted industry standards" and held "because of the thorough methodology described above, the flaws in [the expert's] testimony Plaintiffs now allege, even if accepted as true, do not render his opinions unreliable").

#### **D. Dr. Allen Considered Sufficient Facts And Data**

Cree argues that Dr. Allen did not rely on sufficient facts and data because he tested too few Lightbulbs, did not test Lightbulbs from the appropriate time period, and did not establish chain of custody. Mot. 17-19. Each argument fails.

First, Dr. Allen tested a sufficient quantity of Lightbulbs. His testimony relies on his testing of 10 Lightbulbs, 5 of which he measured intact, and 5 of which he took apart to confirm how they were built and what their components were. Allen Dep. I 56:8-57:7. Dr. Allen did not need to test more Lightbulbs; he "needed one intact lamp, [and] one teardown lamp for each type to compare." *Id.* at 57:6-7. Dr. Allen was not conducting a reliability lifetest nor was he testing how many LED Lightbulbs failed. *See id.* at 26:9- 13, 82:20-83:4, 99:9-21; Allen Rebuttal Report at § XI ¶ 2.a. Instead, he was measuring the temperature of each Lightbulb to quantify the extent to which certain lamps



may be overheated” (Allen Dep. I 82:20-83:4); a large sample is not necessary to achieve reliable results for this type of test. Allen Rebuttal Report at § XI ¶ 2.a, § XI ¶ 5.a.

Cree’s arguments regarding statistical significance fail for the same reason. Dr. Allen opines that there is a common design defect among the Cree LED Lightbulbs at issue. He does not opine as to a particular failure rate. It is spurious to argue that Dr. Allen needed to conduct a statistical analysis to opine that the LED Lightbulbs with a common thermal management system that operates too hot will prematurely fail from the overheating in a consumer application. The two cases cited by Cree are inapposite and factually distinguishable. In *Apple v. Atlantic Yards Development*, the court evaluated an expert’s damages calculation and the issue was whether a national survey of the workforce was a representative sample of union members in five different New York trade unions. No. 11-cv-5550-CBA-SMG, 2015 WL 11182422, at \*5 (E.D.N.Y. Mar. 31, 2015). The court held that it was not and thus excluded the expert report. *Id.* at \*6, 8. *Grodzitsky v. American Honda Motor Co.*, is a California case in which the proffered expert testimony was specifically “couched in terms of probability – Akhavein testified that ‘it’s *more likely than not* that a failed Honda regulator is going to have failed because of this design defect.’” No. 2:12-cv-001142-SVW-PLA, 2017 U.S. Dist. LEXIS 222399, at \*14 (C.D. Cal. Oct. 30, 2017). Dr. Allen’s opinions here do not depend on the statistical significance of a sample size because, as Dr. has repeatedly asserted, he is not conducting a reliability test but a scientific investigation into the thermal management systems of the LED Lightbulbs. Allen Rebuttal Report at § XI ¶ 2.a.

Second, Dr. Allen’s testing is sufficient to extrapolate to the 30 Lightbulbs identified in his report. *See* Allen Report at 3 & Table 2 (identifying Lightbulbs). That is because, as explained above, the thermal design and internal components of the Lightbulbs are consistent within each lamp architecture Dr. Allen identified. *See supra* § IV.A. As he explained in his deposition, variations in design are why he broke them down into the “seven lamp types,” which “represent differentiation

among generations.” Allen Dep. I 47:7-48:7. Ultimately, there are only four lamp architectures that matter for assessing the thermal design of the Lightbulbs. Allen Report at 64-66. And the four architectures share a common design defect.

Finally, Cree’s chain-of-custody argument must be rejected. Cree claims Dr. Allen cannot prove the samples he tested were authentic. Mot. 17. But an expert need not base his opinions solely on admissible evidence. Fed. R. Evid. 703. Nor is there any real doubt as to the authenticity of the Lightbulbs Dr. Allen tested. He obtained Lightbulbs from third-party retailers (Amazon, 1000bulbs.com, and eBay), and they were all in the original packaging. Allen Dep. I 58:3-59:11. And although Plaintiff requested that Cree produce exemplar Lightbulbs for testing, Dr. Allen could not use the Lightbulbs provided by Cree because they “were not the bulbs requested.” *Id.* at 62:4-5.

#### **E. Dr. Allen Did Not Ignore Contradictory Data**

Cree argues that Dr. Allen ignored “documents that show that the failure rate of Cree LED Lamps has never consistently exceeded 2%” and “did not independently confirm whether Cree LED Lamps were actually failing at a higher than expected rate.” Mot. 19. Not so. Dr. Allen made clear in his report that he is not testing nor measuring the failure rate of Cree’s Lightbulbs rather he is testing for the existence of a design defect. Allen Report at 1. Dr. Allen’s testing established the existence of a design defect in the Lightbulbs that causes them to run too hot, which results in the premature failure of their electronic components, which in turn results in the premature failure of the Lightbulbs themselves. *See supra* § IV.

Nor did Dr. Allen “assume that the mere fact that plaintiff filed this litigation proves plaintiff’s claim.” Mot. 19. He *tested* whether the Lightbulbs are defective, and based on his measurements, observations, and engineering principles applicable to the design of LED lightbulbs, concluded that they are. *See* Allen Report at 1 (explaining his objective was “to review and evaluate the evidence and state [his] opinions” and “determine whether a common failure mode exists for a discrete set of LED

lamps”); Allen Dep. I 18:21-19:8 (explaining that instructions for this assignment were to determine: “Are there common elements in each of the Cree lamps, which are susceptible to failure. Given the operation of each of the Cree lamps, are they operating in a mode, meaning temperature, which would risk a high failure rate. And what are those modes.”), 35:16-17 (“I have been totally objective in my evaluation here.”).

Finally, Dr. Allen did not ignore that Cree Lightbulbs obtained Energy Star qualification for 6,000 hours. Mot. at 19. Moreover, it is not perplexing that Dr. Allen testified at his deposition that the Energy Star qualifications have no bearing on his opinion nor is it an acknowledgment of a flaw in his methodology. The reason is very simple and has been explained many times over in his reports and at his depositions. Energy Star testing, which does not account for on-off cycles, is not designed or sufficient to ensure the reliability of LED lightbulbs operated in typical consumer applications with on-off cycles and, thus, higher ambient temperatures. Allen Report at 73; Allen Rebuttal Report § V ¶ 5.b.iv; Pattison Dep. 68:1-22, 134:6-16 (Energy Star testing does not include on/off cycling).

## **VI. Conclusion**

Dr. Allen is qualified, and his testimony is relevant and reliable. Dr. Allen applies fundamental principles of engineering design to Cree’s design of the Lightbulbs, concluding that they have poor thermal management and operate too hot at three specific locations (the LED junction, electrolytic capacitor, and heat sink), which results in electronic components failing under normal and instructed use conditions. That, in turn, causes the failure of the Lightbulbs in advance of their advertised longevity. Because Dr. Allen’s testimony satisfies the standards of Rule 702 and Daubert, Plaintiff respectfully requests that the Court deny the Motion in its entirety.

Dated: July 28, 2021.

Respectfully submitted,

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